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ABSTRACT

Four papers on geography and map libraries were presented at the 1986 International Federation of Library Associations (IFLA) conference. "Generation and Utilization of Maps and Atlases in Japan," by Takashi Morita of Japan, presents an overview of the making and uses of maps and atlases in Japan and concludes that a comprehensive national map cataloging system is needed as well as a nationwide map library or museum. Related statistics are presented in graphic format. In "Report on the Library of Congress and Other Federal Agencies' Optical Disc Development for Cartography," Ralph E. Ehrenberg (United States) presents a status report on the Library of Congress Optical Disc Pilot Program and the development of optical disk technology projects for cartographic materials at several official mapping organizations. "Map Libraries and Optical Disks" (Lorraine Dubreul, Canada) describes optical disk technology as well as applications at the National Library of Canada and the U.S. Library of Congress. Finally, "Digital Maps and Map Libraries" (Sarah Tyacke, United Kingdom) considers the issues involved in establishing a series of national geographic/cartographic databases, including monitoring database production, new forms of storage and information retrieval systems for archiving, legal deposit and copyright laws, the organization of an archive at the national level, and the necessity for setting up a consultative body. (KM)

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General Conference

Special Library Division

Section: Geography and Map Library

Tokyo, Japan
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IFLA GENERAL CONFERENCE, TOKYO

1986

Division: SPECIAL LIBRARY

Section: GEOGRAPHY AND MAP LIBRARY

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GENERATION AND UTILIZATION OF MAPS AND ATLASES IN JAPAN

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ABSTRACT

The aim of this paper is to present an overview of the making and uses of maps and atlases in Japan. For this purpose, two types of questionnaires were carried out, one to map publishers asking them what kind of maps they make, the other to public and university libraries asking them what kind of maps they collect. As a result of these questionnaires, we have concluded that we need a comprehensive national map cataloging system to clarify the making of maps, as well as a nationwide map library (or museum) with an information center aimed at activating map utilization as one of its functions.

1. Introduction.

Where is the map library representative of all map libraries in Japan? This is not an easy question to answer, since there are very few map libraries in this country. Indeed, the notion of "map librarian" is not very popular. If we consider a map library as a simple map collection classified and differentiated from books simply by the fact that they are maps, there are many such libraries. However, if we consider it as a collection of materials listed under the subject of "map" which include not only maps but also atlases, globes, relief maps and all materials related to maps, we have nothing as such. This distinction is not well recognized yet and, moreover, people think about maps like consumer goods which are bought as they are needed and thrown away after they have been used. Besides the pragmatic use of maps, they can also be used as documentation materials. For this purpose, a map reference system should exist. But actually maps are excluded from the national book cataloging system. We therefore have difficulties in finding appropriate materials, not only those newly published, but also materials at libraries. Thus, with this in the background, it is better to begin by being aware of the current general situation concerning map publications and collections, so that we can then discuss about what is a

true map library.

2. Map Publications

There are three sectors which are concerned with map publications: the national government, local governments and private publishing companies.

(a). National government: There are three major map making institutions, the Geographical Survey Institute with their topographical maps, the Hydrographic Department with their charts, and the Geological Survey Institute with their geological maps. Many other governmental offices also make original maps thematic to their work. Among them, topographical maps are sold in many large bookstores. However, we must go to specialty stores to buy geological maps, charts and specialized maps. Furthermore, it is difficult to find working maps or research maps which normally go unpublished even though they are printed, since they are made as tools for management in their daily work and are therefore not for sale. As for reference information, the three major map makers mentioned above cover the whole of Japan with a large number of maps which have indexes and references. However, many other maps which have been made spontaneously make no reference materials available for the public. As far as atlases are concerned, there are only a few whose titles are worth mentioning. They are, "The National Atlas of Japan", "The Geological Atlas of Japan", "The Atlas of the Climatology of Japan", "The Atlas of the Natural Environment of Japan", "The Regional Planning Atlas of Japan", "The Atlas of the Ethnography of Japan", and "The Atlas of Dialects of Japan".

(b). Local governments: As in the case of the national

2002

governmental offices, it is also necessary for local governments to make maps as part of the management of their particular region. The offices where maps are often used are offices which deal with urban planning, transportation, roads, sewerage, water supply, the environment, architecture and port authorities. The types of maps in use are mostly working maps and research maps. Apart from the printed and hand-drawn maps, digital maps made using a computer system have already been introduced into some cities and prefectures as a geographical information system or an information system used in planning. However, we have neither comprehensive references nor directory information for either printed or digitalized maps. We will have to wait some time before we are able to see any improvements in this situation. Town atlases published by local governments are quite few in Japan.

(c). Publishing companies: According to the results of a survey carried out in order to make a list of the maps still in print issued by publishing companies, we could count just over 5,000 titles, which include sheet maps, relief maps, globes, atlases, guide books and other books using a great number of maps. Among these materials, maps showing the location of buildings scored the highest ratio, city maps came second, followed by guide maps, and then road maps. The maps showing the location of buildings and the city maps, having very large scales of between 1/1,000 and 1/10,000, represented about half the total number of titles (Fig. 1). Other maps have been published by publishers, but with a smaller number of titles for each publisher. We can verify this by looking at Fig. 2 which shows each publisher

arranged side by side, ranging from the largest number of titles to the smallest. The first has 1,800 titles, the second 60% of the first, the third 40% of the second. The tenth has about 100 titles, the twentieth 25 titles, while the thirtieth has less than 10 titles. In addition to the big series of maps, we can find school atlases, wall maps, globes, reprinted old maps, historical maps, aerial maps, illustrated maps, maps showing cycling courses, maps indicating the locations of monuments to famous people, maps showing disaster areas, and many more. For many cases, we often have difficulties in finding cross references concerning the details of publication.

Therefore, as far as map making is concerned, it is essential that we have a comprehensive national map cataloging system.

3. Map Collections.

Japan has no independent special library for maps, but some institutions do have map rooms with good collections. There are also map corners in many public and university libraries.

(a) Map making institutions: For topographical maps, the Geographical Survey Institute has a complete set of original maps published by the Institute from the very first map to the present day. It also possesses many foreign maps which have been obtained from equivalent overseas' institutions by means of map exchanging. In total, the Institute has about 40,000 maps. The Geological Survey Institute preserve their materials in the same way as the Geographical Survey Institute, having some 100,000 maps which include a large

quantity of topographical maps. As for charts, the Hydrographic Department has a complete chart collection, numbering some 40,000. These institutions are both map makers and map depositories. They do not refuse consultation from the public, but maps are used for internal use rather than for outside use. Their purpose is not to promote the use of their maps by the public at large with an efficient reference system, but to preserve all original maps in the best condition possible. Many other kinds of maps published by each ministry and local governments may have the same system of preservation, but usually they are in no position to do so and the materials are left to be dispersed without any form of cataloging.

(b) Public and university libraries: The most important map collection in Japan is in the map room in the Library of the National Diet. There are 240,000 maps, including 100,000 foreign ones. However, the atlases are to be found in the general book department, while the old maps are preserved separately as a special collected. So there is some difficulty in finding a set of materials in different forms under a certain subject. The Department of Documentation at the Institute of Developing Economies is famous for its map collection which specializes in underdeveloped countries. It possesses some 30,000 maps. Some foundations have inherited materials right from feudal times. Mitsui Bunko, for example, have good collections of old maps. In addition to these important collections, there are collections at public and university libraries. Now we shall examine the characteristics of these collections.

I. Collections of sheet maps and atlases

For this purpose, we again carried out the questionnaires mentioned above. We received 500 replies. The collections may be divided into two categories for analysis, sheet maps and atlases.

I-i. Sheet maps

How many libraries are there which have materials in each different field? As shown in Fig. 3, the number of libraries have been arranged according to the different fields. In public libraries, the first is maps of the province, the second is maps which show the location of buildings, and the third is old maps, while in university libraries the first is topographical maps, the second is miscellaneous maps and the third is geological maps. In public libraries, provincial maps are important, while in university libraries the complete set of topographical maps may serve as the basic information on geography for study.

As for the different types of catalog, the most popular one is the card system followed by booklets, indexed maps and computer terminals. However, only half of the total number of libraries possesses any form of cataloging system for maps (Fig. 4).

The ratio of libraries which have map cases to those which do not is 60% , and there is no difference between public and university libraries (Fig. 5).

For the preservation of maps, 40% are kept unfolded in both public and university libraries, while 30% are folded in public libraries, with 20% in university libraries (Fig. 6).

I-ii. Atlases

We shall examine the situation regarding atlases in the same

way as sheet maps above. What fields do the atlases which libraries have cover? As shown in Fig. 7, the first is general atlases, the second atlases which show the location of buildings, and the third road atlases in university libraries. In public libraries, the predominant use may be for practical reasons because of the atlases which show building locations and road atlases. In university libraries, the predominant use may be for study because of the general atlases, miscellaneous atlases and, moreover, foreign atlases. Among the different types of catalog, the one most used is the one which uses cards, followed by computer terminals and then booklets (Fig. 8). There are more terminals equipped in public libraries than ever before, because of their continuous introduction into libraries over the past two decades (Fig. 9).

For the preservation of atlases, 20% of public libraries and 40% of university libraries have racks for atlases (Fig. 10), if the libraries have a map corner.

II. Possession of a map room or map corner

20% of public libraries and 30% of university libraries have a map corner (Fig. 11), but rarely a map room. In public libraries, materials are insufficient to merit a map room. And if there is no open access system, the answer is "no", even if they have such materials.

III. Visitors

There are many libraries which give a "no answer", because it is impossible to estimate the number of visitors if an independent map room does not exist. So the given numbers are mostly rounded ones, while it is the public libraries which have more users than the university libraries (Fig. 12). In public libraries, there may be many pragmatic uses

in people's daily lives.

As far as the uses of maps are concerned, the problem is how to find the appropriate materials for each particular subject. This is due to the lack of an efficient reference system. Obviously, the exchange of clearing information between the libraries which have special materials is hard to do. To improve these conditions, each library should first prepare a list of materials related to maps.

4. Conclusion

As a result of the two questionnaires, it has now been clarified that reference information systems are lacking, not only concerning new materials, but also concerning the ones which already exist. The development of computer systems does not demand the centralization of all materials, but it is enough for each library to have a specialized collection. If each library makes available information about its own collection (not only reference information, but also images of the maps themselves), then they may be connected by a communication network system. At that time, people will be able to obtain access to appropriate materials from any one of the libraries.

With the present situation, whether this image is correct or not is not important, rather we should begin at least by setting up a national map cataloging system to clarify map making, while each library should make efforts to create a list of materials about its collection to activate the use of maps. A nationwide map library (or museum) with an information center may be useful in assisting the realization of this idea.

Fig. 1. Apportionment by fields

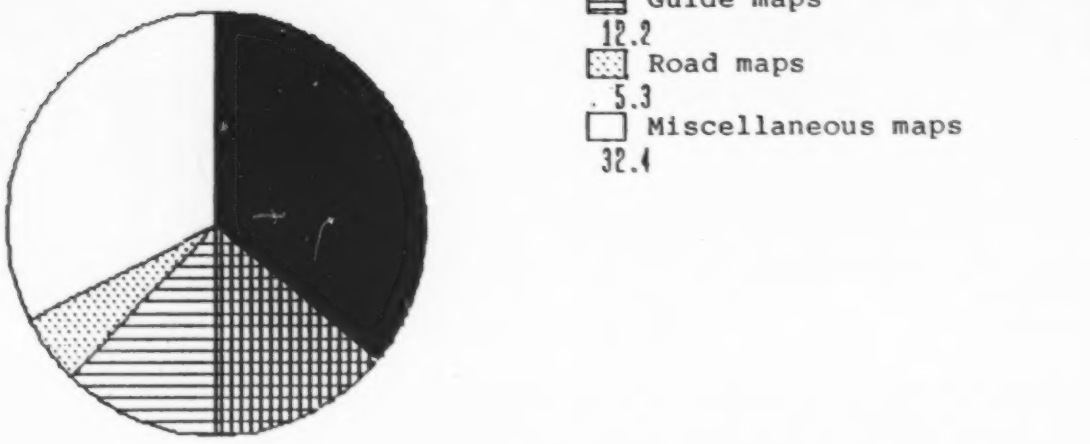

Fig. 2. Number of titles by publishers

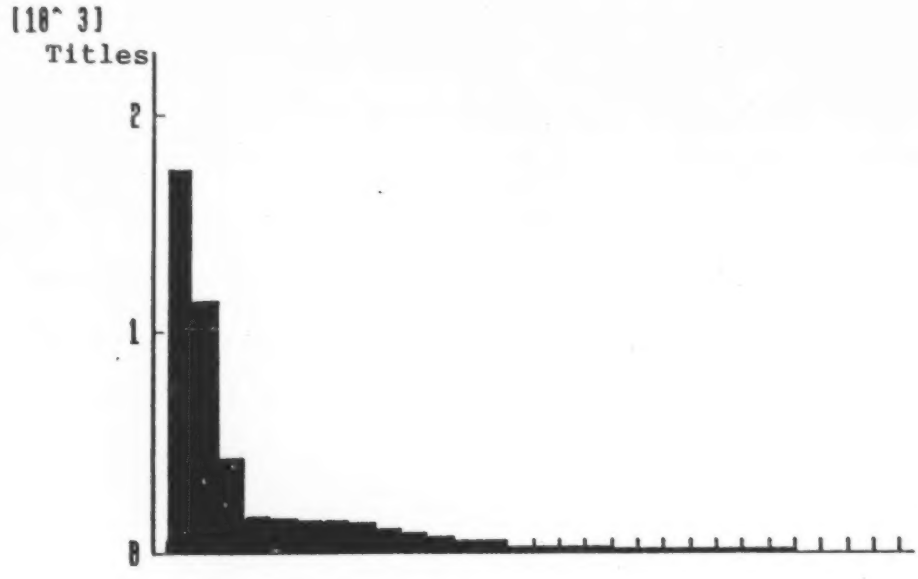

Fig. 3. Number of libraries by the types of map collection

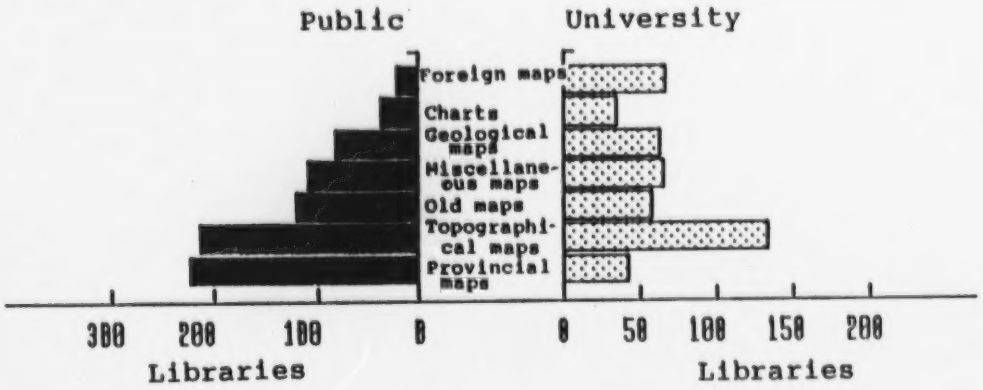

Fig. 4. Types of map catalog

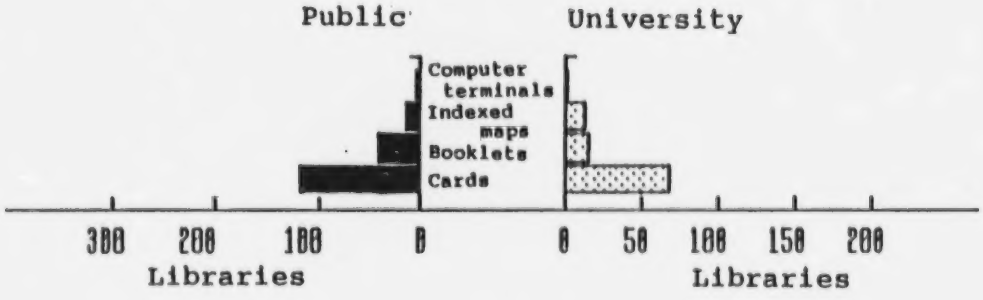

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Fig. 5. Libraries with map cases

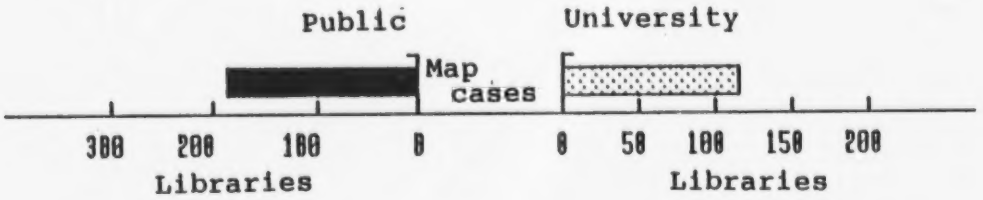

Fig. 6. Folding or non-folding of maps

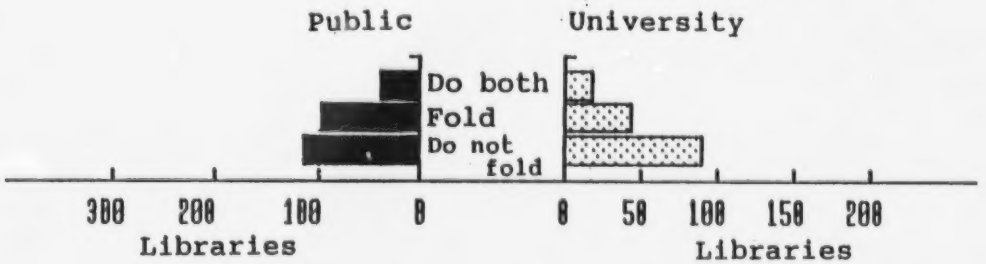

Fig. 7. Number of libraries by the types of atlas collection

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Fig. 8. Types of atlas catalog

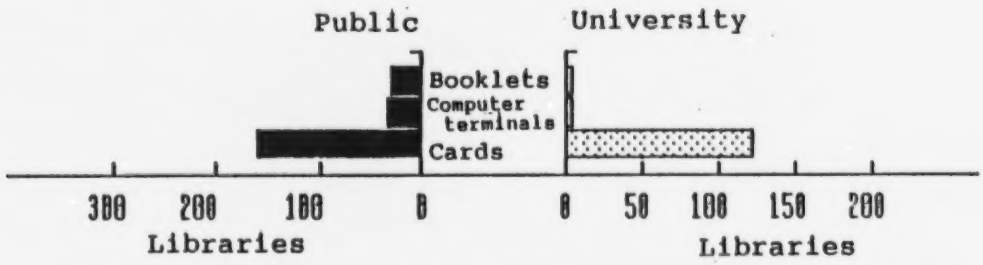

Fig. 9. Years established

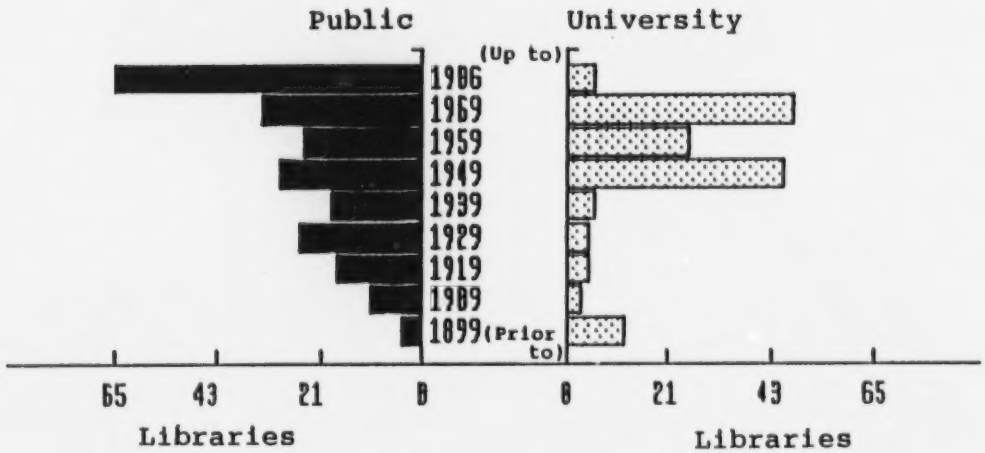

Fig. 10. Libraries with atlas racks

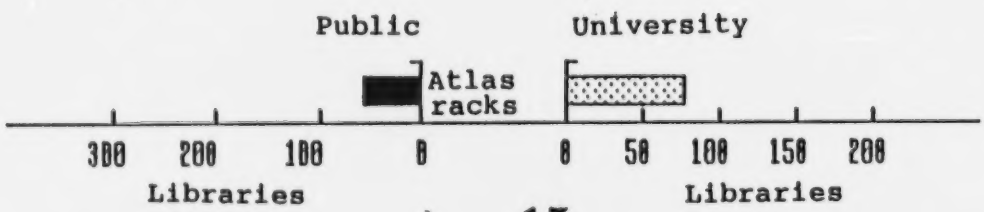

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Fig. 11. Libraries with map rooms or map corners

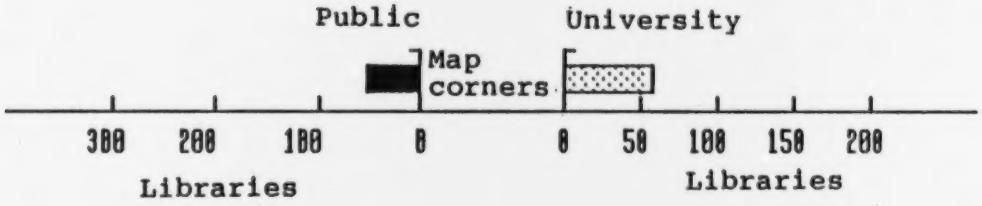
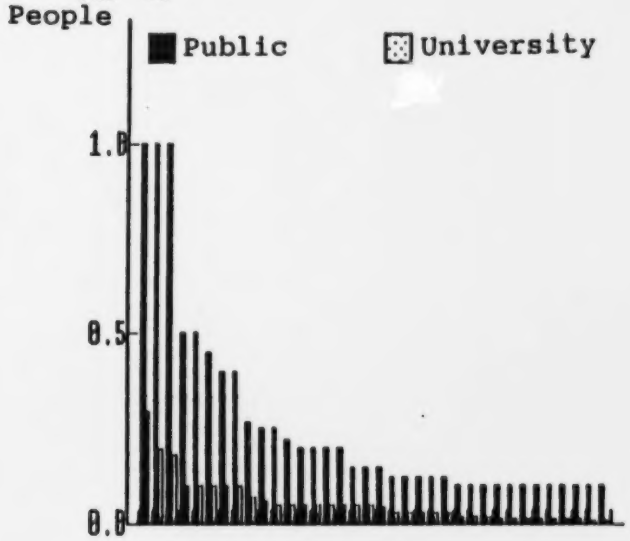


Fig. 12. Number of visitors per month
[10^ 3]



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IFLA GENERAL CONFERENCE, TOKYO

Division: SPECIAL LIBRARY

Section: GEOGRAPHY AND MAP LIBRARY

1986

198-GEO-S-E

REPORT ON THE LIBRARY OF CONGRESS AND OTHER FEDERAL AGENCIES' OPTICAL DISC DEVELOPMENT FOR CARTOGRAPHY

By Ralph E. Ehrenberg

Library of Congress

Washington, D.C. U.S.A.

KEYWORD(S):

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Map Libraries

Cartography

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Report on the Library of Congress
and other Federal Agencies' Optical Disc
Development for Cartography
IFLA, Tokyo, 1986

Ralph Ehrenberg
Library of Congress

My talk this morning is a status report on the development of several optical disk technology projects for cartographic materials including one being conducted by the Library of Congress as well as several official mapping organizations in Washington, D.C.

Optical disc technology appears to offer the map librarian an improved system for preserving and accessing maps vis-a-vis preservation microfilm or other forms of information storage. In terms of preservation, optical disc offers a more stable storage medium than microfilm since it is read by reflected light thereby eliminating wear or image degradation during playback or transfer. In terms of storage and access, optical technology offers high density recording and storage capacity of digital images that can be accessed rapidly and accurately.

Because it is a computer driven system, optical disc technology may also provide expanded reference opportunities for map librarians such as automatic calculations for the latitude/longitude of points on the earth's surface, distances between points, or the number of hectares or acres within an area. It may also be used for locating places by name or

feature, listing towns, rivers, mountain peaks, and other geographical features on maps.

The Optical Disc Pilot Program at the Library of Congress began in 1982 under the direction of William Welsh, the Deputy Librarian of Congress, with the establishment of an Optical Disk Storage Committee. The objective of the program is to evaluate the use of optical disc technology with reference to the preservation and management of library materials.

The Library's Optical Disk Pilot Program consists of two sub-projects- the print project, which uses digital technology to scan, store, and retrieve print or text based materials, and the non-print project, which uses analog technology to capture image-based materials such as prints, photographs, motion pictures, and sound materials.

At the outset of the pilot project, cartographic materials were assigned to the print or digital system because of its higher resolution display capability and its excellent image processing and enhancement features. The analog or videodisc system was not considered for maps by the Optical Disc Committee because the Library's optical disc system does not make use of high definition television which has not yet been standardized in the U.S.

During Phase I of the digital project, which ran from September, 1984 to December 1985, the Optical Disc Print Pilot Project Operations Staff scanned and input some 4,000 previously indexed full text documents and articles from the Library's Congressional Research Services Bibliographic Citation File (BIBL) using optical digital imaging and storage technology for document input and delivery at image display terminals located in the reading rooms. An existing in-house machine readable

retrieval system and language known as SCORPIO, (which stands for Subject Content Oriented Retrieval and Processing of Information Online), was used to index and retrieve these documents.

Phase II, which began this year, will focus on files that generally have no existing machine indexing associated with them and therefore access methods must be designed for them. The maps data file falls into this category and my comments concerning maps are based on preliminary discussions I have had with the Program Operations Staff since input scanning of the maps database has not yet begun.

To test the relevance of this technology for maps, we have selected three heavily used map series or sets pertaining to the Washington, D.C. geographic region. These are:

1. The United States Geological Survey topographic quadrangles for Washington, D.C., and the adjoining states and Virginia. These detailed maps date from 1879 the present. The sheets are arranged alphabetically by State and the District of Columbia and are controlled by graphic indexes. There are approximately 2250 maps in this series.
2. County and city landownership atlases for Washington, D.C., Maryland, and Virginia. These atlases contain detailed maps of county subdivisions arranged alphabetically. The collection contains 33 atlases or about 1200 individual maps, dating from the late 19th century. They are heavily used by genealogists

4856

because they contain names of early land owners.

3. ADC Street Atlases for the Washington, D.C. metropolitan area. This is a commercial atlas that contains street names and names of official buildings.

Originally we had also planned to include the basic topographic series of maps of Poland and Germany, which were published at a scale of 1:100,000 by these countries before World War II. These series, which are also extensively used by genealogists to locate place names of small villages in Eastern Europe, were found to be too detailed for the existing equipment.

For the production of the maps database we will be using the existing hardware system which is designed for text pages rather than maps. Developed by Integrated Automation of Alameda, California, it is a modular system, which allows the addition of new components as the technology develops, or additional resources become available.

Map images will be input on a multi-purpose scanner which is capable of scanning material up to 11 x 14 inches, but which is then compressed electronically to 8.5 x 11 inches to allow for display on CRT screens of comparable size. For maps, the scanner will be fed manually although this scanner has an automatic feeder capability for text materials. Since the scanner is limited to ledger page size (11 x 14 inches), each map will have to be sectionalized or grid scanned. We estimate that 3000 maps and atlas pages will comprise the project, resulting in approximately 20,000 map images.

The maps will be scanned, stored and printed in black and white half-tone images at a resolution of 300 x 300 lines per inch. That means

that every inch on the map page is scanned 300 times, and the information content is changed into a series of zero and ones, or binary representation. The objective of the program is to store between 10,000-15,000 highly resolved map pages on one side of an 12 inch optical digital disc. Color has not been considered since each color must be separated at scanning and then stored and retrieved separately, making the cost prohibitive at this time. An important feature of the digital system developed by Integration Automation, however, is that the image enhancement algorithms also provide a good representation of a gray scale for halftones, which should help to distinguish the various colors and tonal variations found on many maps.

Other pertinent hardware includes:

An ATG, or Alcatel Thomson Gigadisk Optical disk drive which is a self contained optical disc drive unit which has the capability to read the map image directly after it has been written onto the the optical disk. These images are initially stored on a magnetic disc buffer prior to images actually being written on the optical disc to allow for full review.

The jukebox, or optical disc mass storage module, stores up to 100, 12 inch optical digital discs, mounted in two storage carousels of 50 discs each. When a disc is requested, it is commanded to be fetched and spun up by the retrieval subsystem, the desired image is then read by a low power laser, and then returned to its original location in the carousel.

Display terminals are used for searching and retrieving the map image or the full text images. These terminals have a high resolution video display monitor, a Video Display Terminal memory, and Video Display

controller. The video monitor displays at 150 x 300 lines per inch, although a laser printer unit can provide copies of documents at a resolution of 300 x 300 lines per inch. A modified Xerox 5700 laser printer interfaced directly to the jukebox can provide batch printing of documents at a rate of 43 documents per minute. In addition, two modified Xerox 2700 printers attached to two of the user terminal displays can print up to 12 pages per minute.

The software system for input and retrieval of maps will be designed by the Library's Automated Systems Staff.

The searching and displaying of maps as well as other fine print documents in the Optical Disc Pilot Project will be through the Library's SCORPIO retrieval system. Because the Optical Disc Project Program for maps is not yet operational, the exact form of the Optical Disc SCORPIO map file has not been finalized. The record input will be carried out by the Program's Document Preparation Section who will key the data online using the SCORPIO input system.

The retrieval and bibliographic requirements for maps are currently under development. The first step, however, will be to create a document control number and identifier or index record for cartographic materials in order to track an individual map through the entire system. The document control number is the basic machine element required for input and retrieval. It will consist of a maximum of twenty alphanumeric characters.

The document identifier or index record may consist of the following data fields: name of the geographic area; geographic classification number (that is, the Library's G Class number); date of information; subject matter, if applicable; and copyright use conditions which will in-

4859

dicate the status of copyright.

The purpose of the maps file will be to provide the full image of an individual map via optical disc technology. A researcher will approach the file through a sequence of scanned map indexes. In the case of the Geological survey quadrangle series, for example, the reader will be able to browse the appropriate map index from which he or she can then determine the specific quadrangle coverage. Once the map image is called up, the reader will be able to view it in sections, reading the map from left-to-right, and from top-to-bottom. The maps will be scanned with sufficient overlap from section to section for the researcher to be able to follow the sequence of images within each map.

If the Phase II pilot project for maps is successful, we will prepare a proposal to employ optical disc technology for a broad range of cartographic materials and reference tools in the Geography and Map Division. At that time, we will also request large bed scanners and displays which are suitable for maps.

In addition to these efforts at the Library of Congress, several mapping agencies of the United States government in Washington, D.C. are testing the feasibility of optical disc technology for cartographic materials. At a recent one-day Video Disc Workshop, sponsored by the U.S. Geological Survey in Reston, Virginia, representatives from seventeen Federal agencies described current or proposed projects involving optical disc technology for cartographic materials.

Unlike the proposed test for scanning maps at the Library of Congress, most of these projects involve analog videodisc. In the analog system, maps are first photographed, usually on 35mm motion picture film,

and then the film is transferred to videotape, and from that videodiscs are then mastered and stamped out, much like phonograph records. Each disc can carry up to 54,000 individual TV resolution images on one side of a 12-inch disc. The major advantage of the analog videodisc system with respect to cartographic materials is that it provides the reader with a color image rather than black-and-white image. Since video disc technology was developed in the 1970's for the entertainment community as a storage and display medium for movies, the hardware is also available off-the-shelf.

The major disadvantage in comparison to digital optical disc is lower resolution (about 525 lines per screen). Another disadvantage is the static nature of the data base. Since the data is first captured on motion picture film, the file can be updated only by refilming.

When combined with a micro computer, incorporating a database management system, an analog videodisc can randomly access independent products or frames instantaneously. When the analog videodisc is coupled with the microcomputer, telecommunications, and graphics, it affords the capability to transmit map information between various independently located videodisc workstations using phonelines in real-time.

Representative of these current developments is the INTERAGENCY Video Disc Prototype for Emergency Operations. It has been developed by the United States Army Corps of Engineers, Water Resources Support Center, in conjunction with the Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), United States Geological Survey, and United States Coast Guard. This prototype system was devised to test and evaluate the interagency application of video

technology for interagency responses to regional emergencies such as hurricanes, floods, and other natural disasters. The objective of the prototype project is to allow agency officials located in different states and cities to coordinate regional activities using the same map data. Other applications, however, are also being tested. These include applications for storage and retrieval of map products, training and briefing systems, and information networking.

The test region is the Gulf Coast of the United States. The system's analog video disc map data base consists of 108,000 frames (one full two-sided video disc). It includes eight 1:2 million USGS maps; 129 - 1:250,000 USGS maps; 1400-U.S. Army Corps of Engineers' large scale river and project charts; 1000 - Corps of Engineers' large scale ground and aerial photographs; 300 - flood plain published by the Federal Emergency Management Agency; and nautical charts, aeronauctical charts, airport charts and satelite imagery at various scales furnished by the National Oceanic and Atmospheric Administration. The result is an extensive map data base related to the New Orleans, Galveston-Houston, Tulsa and Dallas-Fort Worth areas. The analog disc map data base is accessed through a IBM PC/XT microcomputer by geographical location, longitude and latitude, proper name, and product name. The video disc map image is used as a background map for graphic overlay information that is transmitted between video disc workstations. By placing a light pen on the monitor screen, the reader can zoom from a small scale map image to a larger scale image.

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Division: SPECIAL LIBRARIES

Section: GEOGRAPHY & MAP LIBRARIES

197-GEO-4-E

MAP LIBRARIES AND OPTICAL DISKS

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Map Libraries and Optical Disks

by

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All library collections seem to need more space than institutions and budgets can provide, and therefore all are suffering space problems. Space problems generate preservation problems when library materials are no longer stored under optimum conditions. Storage problems often lead to retrieval problems, which then affect the access to library materials. Map libraries are no exception. Early attempts to solve preservation problems led many libraries to start microfilming their collections. In 1977, the National Map Collection in Canada started a 105 mm microfilming program. However, once these microfiche become available to replace the original document, one still has to store them in a manual storage system, and view them using the prescribed

4864

equipment. The arrival of the computer in the library field has led to better sorting, handling, and retrieval of the catalogue records, but has not done the same for the individual microfiche of the item described by the catalogue record. The introduction of the microcomputer to libraries offered the possibility of a "stand alone" station, where a patron could identify the catalogue record and view the materials on the same machine. The optical disk linked to a microcomputer is particularly well suited to do this.

Optical Disks

An otical disk can be used by libraries as a medium for the storage, retrieval, and preservation of audio, audiovisual, image, text, and machine readable data. The optical disk relies on the use of optically sensitive materials to store information. Although there are many different types of optical disks, it is the optical video disk that is of interest to us in map libraries. It looks much like a long-playing record. It is both formed and played back with a laser beam. First I shall outline the

storage capabilities of the optical video disk. A 30 cm (or 12-inch), two-sided video disk can store 108 000 separate images, or 54 000 images per side. If one adds in user-selection menues and other textual material, this same two-sided disk could store about 50 000 separate images (3). This is equivalent to 675 trays of 35mm slides. This single two-sided disk can be replicated at a unit cost of $10.00 per video disk (3), or even as low as $1.50 each if 20 000 or more copies are produced (6). This cost does not include original production and mastering cost.

Next I shall discuss the random accessibility available on the video disk. Industrial video disks contain concentric tracks with one videoframe per track. Therefore each of the 54 000 separate tracks per side of a 30cm (or 12-inch) of a video disk can store one frame. It is because each frame is in a separate track that random access and freeze frame capabilities are available. It also allows for easy updating of a partially filled disk, as updating or adding frames does not interfere with images already stored on the disk. (The consumer disk format, which is intended for the entertainment market is of little interest to commercial applications and computer hook

ups, because it utilizes a continuous spiral to allow for 1 hour of continuous play-back per side.)

And finally, the accessibility of video disk via microcomputer has been a factor in its potential for storing data in cartographic collections. Since some maps or series of maps could not be shown complete in one frame, the computer access program must allow for a positioning of each map or frame within the context of the whole. In present "hard copy" map collections, the index map performs this role for the map series.

In a similar fashion the computer could show the whole map, with a numbered grid superimposed on the map. These numbers would identify the frame number which should be selected to show the desired part of the map.

Operational Applications in North America

The National Library of Canada was one of the first institutions to do research in the use of optical disks. Their early work, which was called "The National Library Videodisc Demonstration Project", was carried out between 1981 and 1983. This project resulted in the production of a video disk

which contained four products: (1) a 16mm film on Canada's National Library (2) a 35mm slide show, Canadiana, (3) The history of "O Canada", and (4) a walk through the National Library. These four products were able to take utilize the full potential of the optical disk, and thereby demonstrate its versitility.

In 1982, the Library of Congress announced that the Cataloguing Distribution Service would start using optical disk technology to store library catalogue card images. The system, which was dedicated in August 1982, was called the DEMAND System. It was intended to replace the manual system then in use by the CDS, which produced non-MARC printed cards. More than 200 000 images of catalogue cards can be stored on one side of the 14-inch optical disk. This is equivalent to 140 card catalogue drawers. This system is presently being used to fill orders for catalogue cards. It has proved to be quick and cost effective. The success of the DEMAND System has encouraged LC to explore further the use of optical disks in its operations (6).

In 1983, LC announced another project, "The

Library of Congress Optical Disk Pilot Program". This project, which should be completed in 1986, will have two main components: one involving print materials and the other involving non-print materials. One million images are to be scanned for the print project, using materials chosen from popular and scientific journals, four legal collections, manuscripts, sheet music, maps, and technical reports.

Conclusions

There is no doubt that optical disk technology will play a major role in the preservation and access to library materials. The experimental projects at the Library of Congress using optical disks are most likely to provide the data for a realistic assessment of its potential in library and information applications. The limitations in the use of optical disks in map libraries will, as in all new technologies, be a matter of costs.

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4870

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Division: Special Libraries

Section: Geography and Map Libraries

123-GEO -1-E

Digital Maps and Map Libraries

by

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British Library Map Library

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1537

In 1984 the UK House of Lords Select Committee on Science and Technology presented a report of their enquiry into the development of remote sending and digital mapping in the United Kingdom. One of the recommendations was that 'the British Library and other legal deposit libraries should be responsible for preserving a retrospective archive of UK digital maps and remote sensing images'. This recommendation was later accepted by the UK government in its White Paper of 25 July 1984 (Cmnd. 9320). This raises a number of important issues for British map libraries, many of which will be similar for libraries in other countries.

1. Preservation of a series of national geographic/cartographic databases. How databases are, and will be, used, will have considerable effect on how the databases should be archived and, indeed, on where they should be archived and user services provided. If, for example, it is considered likely that users will require access to the databases in digital form rather than in map or image output (i.e. analogue) then the structure of the databases, their format and attendant software will be that much more complicated (and expensive), than that necessary for a database from which maps or images may be viewed or plotted.

1.2 The second option is comparable to present reader and customer use, but it is not at all clear that this analogue form would suffice in the future to serve the needs of researchers.

1.3 Present academic use of current databases requires the ability to manipulate the information for analytic and other purposes and to combine or integrate information from different sources. There is however, little information on the potential use of digital databases in this field in libraries and in other organisations concerned with information.

2. Monitoring the production of databases available.

2.1 A survey of the production of geographic digital databases in the U.K. reveals a growing use of current information in digital form in some sectors, notably in the universities, government departments, and by local authorities. How far this would translate into use in archive terms, for example, in comparing patters of distribution or features over time, is not yet clear; it is furthermore unlikely to become clear until, for example, topographic coverage of the UK is widely available in digital form from the Ordnance Survey. The effects of this availability on users in general, as distinct from present particular user groups of large or small scale digital information, (e.g. some local authorities) can then be assessed; only at that point will a better idea emerge of the potential use in library or archive terms.

2.2 At this stage however it is essential to monitor the proliferation of databases - the potential archive - and the sometimes consequent disappearance of conventionally produced mapping, which has hitherto been deposited in the British Library and the other legal deposit libraries under the provisions of the Copyright Act of 1911. By this means a proper approach to national collection development or archiving can be established. In the case of currently available

databases a catalogue of these has been compiled as a result of an investigation undertaken by Professor David Rhind and Sara Finch of Birkbeck College, London University, with the collaboration of the BL Map Library.

2.3 The accompanying report recommends that the database be kept up-to-date as part of the BL cartographic materials file. To date 220 such databases have been recorded on the BL cartographic materials file. This has required, and will require, the goodwill and co-operation of producers and holders of digital databases and, if it is to be useful to the information community at large, a system of automatic updating on the production or acquisition of databases should be devised. At this stage, subject to the Library's resources and with the co-operation of the producers, up-dating should be possible. In the event however that the proliferation outstrips resources other co-operative methods would have to be found or additional funding.

2.4 This information file will form one of the crucial elements necessary for assessing how best to select digital map information for historical archiving and how it should best be used, for example centrally or as already suggested for current archiving at various regional or specialist nodes, connected by an appropriate information network. In either case (or even in a mixture of the two) it will be necessary to seek advice on selection policy from producers, users, the holders of digital data, as well as from libraries and archives. (See Appendix I for a sample of the digital database record file).

3. The provision of new forms of storage and information retrieval systems for archiving such datafiles.

3.1 From discussions with digital map producers and holders of such data, as well as in consideration of research and development in the library world, it seems that the most helpful development, specifically, for digital map library or archive use would be a low-cost, long-lasting medium capable of dense digital storage of images and with the ability to produce as required, either by plotter or in a V.D.U., high resolution maps or images in colour as well as information in digital form. As yet the most likely development for this purpose is the optical digital disc.

3.2 The compact disc (CD) may be of even more use. Discs have not been satisfactorily tested for archival purposes in general, but one such test using digital statistical files is to be undertaken by the Public Record Office in collaboration with the Central Computer & Telecommunicatins Agency (CCTA). In the U.S.A. both the Library of Congress and the Smithsonian Institution are undertaking feasibility studies of optical digital discs for storage. Some maps and photographs will be included in the Library of Congress study but the images will be held on the digital database in black and white and in map sections.

3.3 The Smithsonian study is again of interest, using architectural and other drawings amongst its documentary source material, but the system only has a resolution of 200 pixels per inch, which would not be sufficient for map images.

The British Library has concentrated on and funded research into the application of Compact Disc for the storage of bibliographic records in collaboration with B.R.S. Europe: this system was demonstrated at the Frankfurt Book Fair in October, 1985, and may well have some application in the archival field as well as more generally in the information technology field.

3.4 The other major area of technological change which would be necessary before, for example, a satisfactory network for a retrospective distributed archive could be set up is in the field of telecommunications and specifically in the transfer of graphic images digitally. In this context the Apollo satellite pilot document delivery systems in which BL Lending Division (now the Science & Technology Division) is intending to participate together with NRSC and the European Centre for Medium Range Weather Forecasts (ECMWF) is of relevance.

3.5 In both areas it is likely that the producers of large digital databases, the holders of them, and information providers will have to pursue research and development to accommodate as cost effectively as possible the amounts of data necessary for their current operations. It is essential that the requirements for archiving digital map or remote-sensing data over longer periods of time, and maintaining accessibility possibly to numbers of different databases sequentially arranged by period, should be considered by those concerned with the development of this new technology.

4. Legal deposit and copyright law.

4.1 The Library has drawn attention to the need for clarification of the provisions for legal deposit (UK Copyright Act 1911) as applied to microforms, to databases and to computer software in the UK. The copyright aspects of databases including digital maps have been addressed in the Government White Paper issued recently. In the case of maps, the provision of information for research and/or commercial purposes in graphic or digital form will depend, as before, on the level of copyright protection given to database owners. Traditionally this has been, and continues to be, more strictly interpreted for maps than for books and serials.

4.2 No provision has been made for the legal deposit of microforms, databases and computer software. The present voluntary arrangement in microform deposit by the Ordnance Survey involves an element of cost as does the remote sensing imagery received from the National Remote Sensing Centre. If this were to be the case for each database producer then the acquisition costs of even selected data from selected databases, irrespective of running and other costs might well make the preservation of geographic information in digital form over time impossibly expensive within the terms of any Map Library's overall acquisition resources. In the U.S.A. where the legal provisions for deposit are different, computer software is already being deposited in the Library of Congress and a cataloguing project is being undertaken.

4.3 If no extension of legal deposit is made to microforms, software and databases, it will be necessary to review the levels of acquisition costs: those which are current, those which may be current in the future. It will then be necessary to determine, whether in an archival context, even reduced charges can be borne by the Library and other copyright libraries, designated as holders of the archive. In this context it is worth noting that the problems of archiving digital data, in this case remote sensing data, has recently been reviewed by a panel of the US National Committee on Libraries and Information Services (NCLIS), which recommended that 'in order to preserve many of the public benefits of civil remote-sensing from space, including long-range global environmental monitoring, the Secretary of State shall provide both for long-range storage and maintenance of data and for access to those data'.

5. The organisation of the archive at national level and the necessity to set up a consultative body.

5.1 This will depend on the balance which can be struck between current requirements, often specific-user orientated, and the less immediate or long-term requirement of non-current information: the latter may or may not be required by specific users and should be available for economic, social, historical and geographic research. If in the event, for example, non-current geological or meteorological databases were to be preserved by the organisations who produce them and were made available subject to copyright, improvements in telecommunications, costs, etc., then it might be envisaged that a number of foci or nodes having both current and non-current databases connected by a network might be desirable. This is based, however, on a lot of assumptions about future technical developments.

5.2 Series of basic national geographic/cartographic datasets as an archive.

Irrespective of the specialist non-current databases which may become available at particular research nodes, it seems that the concept of a series of basic datasets collected over time should be discussed and such a series be considered as a central obligation and funded as necessary. This would rest upon a number of selection criteria involving periodicity of deposit; in remote-sensing data these would also include quality of image. These selection criteria can only be determined by a panel or group of representatives from libraries and archives, producers, and users, and should follow established library and archival practices of selection, acquisition, storage and access, where the library and archive community have much experience and expertise to contribute.

5.3 Organisational framework for archiving digital mapping and remote sensing imagery in digital form.

In the UK the British Committee for Map Information and Catalogue Systems (BRICMICS) will be considering the implications of the above from a library and archive point. As yet the only producer with whom it consults officially is the Ordnance Survey, although at individual organisational level each library or archive, including the British Library, may have occasion to consult with a particular mapping agency on matters of mutual interest. It would seem sensible for BRICMICS therefore to consider the problems of archiving digital databases over time with a number of database producers and with their users where relevant.

In particular the views of the Ordnance Survey, the National Remote Sensing Centre, Royal Geographical Society, the Royal Society, and of relevant University departments and datacentres, besides the libraries' present users of conventional mapping, would seem relevant.

5.4 An agenda for such a group would need to include:

1. Finding out who has the datasets.
2. Production of descriptions of them in suitable information retrieval systems (as on BL Cartographic Materials file).
3. Selection criteria which would exclude 'redundant' data however defined.
4. The costs of acquiring digital databases.
5. The costs of acquiring suitably qualified staff to validate and handle the data.
6. Hardware.
7. Software.
8. How to make the data available to users.
9. Standardisation or compatability of datasets.
10. Copyright and reproduction fee considerations.
11. The physical storage and management of the archive.

WORLD. Data files
- [Selected cartographic and remotely sensed datasets] / Hunting Surveys Limited
Boreham Wood : Hunting Surveys Limited, [197- or 198-?]
Scales differ. - data files
Cartographic data supplied on 9-track magnetic tape at 800 or 1600 bpi in MOSS, BIPS or ECU exchange format or in such other format as may be agreed. Remote sensing datasets supplied on computer-compatible tapes, often with photographic products. - Cartographic datasets: many project surveys, and some map series, in the UK, Nigeria, Libya, Nepal, Thailand, Kuwait, Oman, United Arab Emirates, Saudi Arabia, Qatar. Remote Sensing datasets (LANDSAT) : Algeria, Bangladesh, Bolivia, Botswana, Cyprus, Egypt, Falklands, India, Indonesia, Kuwait, Madagascar, Mali, Mozambique, Oman, Pakistan, Panama, Qatar, Somalia, Spain, Sudan, United Arab Emirates, UK, Yemen, Zimbabwe
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mlcrs01643

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Farnborough : National Remote Sensing Centre, 1972-
data files
Covers imagery held at N.R.S.C. other than Landsat imagery. For details contact N.R.S.C.
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For coverage see the N.R.S.C. catalogue of imagery
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mlcrs01325

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- [Selected boundary data] / University of Edinburgh
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Scales differ. - 1 data file
Data holdings include: Countries of the world, regional boundaries of Europe, counties of the US, region boundaries of many countries in the world e.g. Japan, India, Netherlands, etc
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mlcrs01635

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Glasgow : University of Glasgow, 1982
1 data file
World data bank contains outlines and political boundaries; data is available in a variety of projections and in a GIMMS format. - Administrative boundaries available for Morocco, Kenya, Ecuador and China. - Large scale data available for Glasgow
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mlcrs01309

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Swindon : Thematic Information Services, 1982
Scale 1:50 000 000. - 1 data file
Available from: Thematic Information Services, N.E.R.C.
mlcrs00450

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- WIZMAP / British Geological Survey
Edinburgh : British Geological Survey, 1980
1 data file
1 program file
WIZMAP is a package of mapping programmes and coastline files designed to meet the needs of Global Seismology Unit work. 35 different map projections are available
Available from: British Geological Survey
mlcrs01317

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1 data file
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mlcrs01317

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Swindon : Thematic Information Services, 1979
Scale 1:10 000 000. - 1 data file
Seismic Data for 3 levels for each 2° square during 1909-1918, 1919-1928, 1929-1938, 1939-1948, 1949-1958, 1959-1963, 1964-1968
Available from: Thematic Information Services, N.E.R.C.
mlcrs01473